

REMARKS

Present Status of Application

The FINAL Office Action mailed in Jan. 5, 2007 has continued to reject all pending claims 14-20. In this response, no amendment is made and Applicant respectfully submits that all pending claims are clearly in condition for allowance for at least the reasons described below. Indeed, Applicant presents the following remarks in an effort to further point out distinctions to the Examiner at this time, in hopes of avoiding an unnecessary appeal process for this case. The accompanying remarks are necessary in light of the position taken in Final Office Action. The remarks of the instant response further clarify and distinguish Applicant's claimed embodiments over the various grounds of rejection and supporting reasoning presented in the Final Action.

Rejections of claims 14-20 under 35 U.S.C. 103

Claims 14-20 stand rejected under 35 U.S.C. 103(a) as allegedly unpatentable over AAPA in view of Krivokapic et al. Applicant respectfully requests reconsideration of this rejection for at least the following reasons:

Claim 14 recites:

14. A CMOS image sensor device comprising:
a semiconductor substrate;
a sensor diode in said semiconductor substrate comprising a first terminal and a second terminal;
a plurality of gates for transistors in said CMOS image sensor wherein said gates comprise a conductor layer overlying said semiconductor substrate with an insulating layer therebetween and wherein said transistors include reset transistors;
source/drain regions for said transistors wherein said source regions of said reset transistors are formed in said first terminals of said sensor diodes; and
double diffused sources ***only in said reset transistor sources***

to complete an asymmetrical source/drain structure.

(Emphasis added.) Independent claim 14 patently defines over the cited art for at least the reason that the cited art fails to disclose at least the features emphasized above.

In this regard, the claimed **double diffused sources (DDS) are only provided in said reset transistor sources**, thereby forming an **asymmetrical reset transistor**. (See page 17, lines 3-11 and Figs. 5-6 of the specification). It is important to note that the source/drain regions 139 of all other transistors 166 and 170 do not receive the DDS implantation 156 due to the blocking of the masking layer 154. This is important because **increasing the depth of the drain regions of all transistors would cause poor device performance** due to drain induced, barrier lowering (DIBL). Since the **DDS implantation 156 is selectively performed to only the reset transistor 166 source**, the performance of the CMOS image pixel is improved, without degrading the performance of all other transistors.

The rejection of claim 14 relies on AAPA in view of Krivokapic for the teaching of **double diffused sources in said transistors**. The Office Action asserts it would have been obvious to one skilled in the art **make double diffuse sources** in the structure of AAPA in order to improve the performance of the device by means of improving HCI life time. Applicant, however, respectfully submits that **AAPA and Krivokapic** do not teach or suggest at least the the claimed features of “**double diffused sources only in said reset transistor sources to complete an asymmetrical source/drain structure.**” First, AAPA has symmetric transistors, which lack the character of DDS,

thereby causing poor device performance due to DIBL. (See Fig. 2.) Krivokapic et al fail to teach or suggest double diffused source only in a selected transistor. (See Col. 5, lines 54-67 and Figs. 2C-2D.) Instead, in Krivokapic, **every transistor** is provided with double diffused sources/drains. Second, Krivokapic also fails to teach or suggest the asymmetric source/drain regions of said reset transistor in the claimed embodiments. Indeed, Krivokapic teaches forming double diffused drains and double diffused sources simultaneously. (See Figs. 2B-2D). **In Krivokapic's CMOS device, source/drain regions of the transistors are symmetric, as they are in AAPA as well.**

Accordingly, although Krivokapic et al teach double diffused sources, the combination of AAPA and Krivokapic et al would not lead one to selectively form double diffused sources only in reset transistors to complete an asymmetrical source/drain region. Therefore, there is no motivation and no reasonable expectation success for achieving a double diffused source only formed in said reset transistor sources as recited in amended claim 14.

MPEP 2142 reads in part:

To establish a prima facie case of obviousness, three criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teaching. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. **The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure.** *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

In addition, the Office Action asserts that it would have been obvious to omit the double diffuse region in areas other than the source to save cost, by virtue of only using

the double diffused source in source layers when needed. Applicant respectfully disagrees. Selective implantation requires additional mask to protect undesirable areas. This additional mask cannot save cost as asserted by Examiner, but incurs extra cost. Accordingly, the cited art provides no motivation and no reasonable expectation of success for achieving asymmetric source/drain. Even if it could be argued that double diffused drains can be omitted, as there is no teaching or suggestion to form double diffusion source only in the reset transistor, all transistors would have asymmetric source/drain. For at least the reasons described above, independent claim 14 patentably defines over the cited art, and the rejection of claim 14 should be withdrawn.

As a separate and independent basis for the patentability of claim 14, Applicant submits that the combination of Krivokapic with AAPA does not render obvious claim 14. In this regard, the Office Action combined Krivokapic with AAPA to reject the claims on the solely expressed bases of “in order to improve the performance of the device by means of improving HCI lifetime... [and] to save cost, by virtue of only using the double diffused source in source layers when needed.” (Office Action, p. 3). These rationales are both incomplete and improper in view of the established standards for rejections under 35 U.S.C. § 103.

In this regard, the MPEP section 2141 states:

Office policy has consistently been to follow Graham v. John Deere Co. in the consideration and determination of obviousness under 35 U.S.C. 103. As quoted above, the four factual inquiries enunciated therein as a background for determining obviousness are briefly as follows:

- (A) Determining of the scope and contents of the prior art;
- (B) Ascertaining the differences between the prior art and the claims in issue;

- (C) Resolving the level of ordinary skill in the pertinent art; and
- (D) Evaluating evidence of secondary considerations.

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BASIC CONSIDERATIONS WHICH APPLY TO OBVIOUSNESS REJECTIONS

When applying 35 U.S.C. 103, the following tenets of patent law must be adhered to:

- (A) The claimed invention must be considered as a whole;
- (B) The references must be considered as a whole and must suggest the desirability and thus the obviousness of making the combination;
- (C) The references must be viewed without the benefit of impermissible hindsight vision afforded by the claimed invention and
- (D) Reasonable expectation of success is the standard with which obviousness is determined.

Hodosh v. Block Drug Co., Inc., 786 F.2d 1136, 1143 n.5, 229 USPQ 182, 187 n.5 (Fed. Cir. 1986).

Simply stated, the Office Action has failed to at least (1) ascertain the differences between and prior art and the claims in issue; and (2) resolve the level of ordinary skill in the art. Furthermore, the alleged rationale for combining Krivokapic with AAPA embodies clear and improper hindsight rationale. For at least this additional reason, Applicant submits that the rejections of claim 14 is improper and should be withdrawn.

For at least the reasons described above, independent claim 14 patently defines over the cited art, and the rejection of claim 14 should be withdrawn. As all remaining claims depend from claim 14, these remaining claims patently define over the cited art for at least the same reasons.

CONCLUSION

In view of the foregoing, it is believed that all pending claims are in proper condition for allowance. If the Examiner believes that a telephone conference would expedite the examination of the above-identified patent application, the Examiner is invited to call the undersigned.

No fee is believed to be due in connection with this submission. If, however, any fee is believed to be due, you are hereby authorized to charge any such fee to deposit account No. 20-0778.

Respectfully submitted,

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